

Abstract - Hazards of mercury to wildlife

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From a toxicological point of view, mercury is one of the most intriguing environmental contaminants that affect wildlife. The biological transformation of other chemical forms of mercury to the highly toxic methylmercury form and the accumulation of methylmercury in aquatic food chains poses a threat to many wildlife species, but especially those inhabiting aquatic environments. Methylmercury has harmful effects on adult survival, reproduction, behavior, and cell development, and is teratogenic. Methylmercury can cross the blood-brain barrier, is readily excreted into the eggs of birds, and is transferred to young mammals across the placenta and in the mother's milk. When methylmercury was used as a seed dressing it caused widespread kills of birds, largely reported in Scandinavian countries. With the banning of these highly toxic seed dressings, mercury problems are now centered primarily in wetlands. In Canada, where past uses of mercury in chlor-alkali plants and as fungicides in the paper and pulp industry created high levels of mercury in fish and shellfish, wild mink (*Mustela vison*) and otter (*Lutra canadensis*) are known to have died from methylmercury poisoning. With birds, the reproductive success of common loons (*Gavia immer*) and common terns (*Sterna hirundo*) is believed to have suffered because of mercury pollution. In addition to its harmful effects by itself, mercury can interact with other environmental contaminants, such as selenium, in sometimes unpredictable ways. For example, although mercury and selenium are generally believed to counteract each other's toxicity, we found that the combination of methylmercury and selenomethionine fed simultaneously to mallards (*Anas platyrhynchos*) caused far worse harm to embryos than either one separately. Unfortunately, more is known about the *possible* harmful effects of mercury on wild mammals and birds than is understood about the *actual* harm current levels of mercury are causing. The main reason for this uncertainty is the great difficulty studying wild populations and separating out the effects of mercury from those of other environmental stressors. To aid in the assessment of the hazards of mercury to wildlife, many controlled laboratory studies have been conducted, especially with birds. Some recent studies, such as those to determine minimum thresholds of mercury that cause harm to avian embryos, are discussed. The question of how much mercury in the diet and tissues of various wildlife species is indicative of harm remains the biggest research challenge in assessing mercury hazards. Wildlife, unlike humans, cannot escape exposure to mercury-contaminated environments or regulate their consumption of mercury-laden foods. Therefore, determining what the harmful thresholds of mercury are for many representative wildlife species is of great importance, not only to the wildlife species themselves, but for human health as well because it is quite possible that restrictions of mercury that protect wildlife will also protect humans.